

CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1 1. An apparatus for cleaving an optical fiber mounted in a holder having a
2 central axis and having an end face from which the fiber projects, to produce a fiber end
3 face that is flat and substantially flush with the holder end face, said apparatus
4 comprising:

5 a movable support member upon which said holder is mounted;

6 a laser for producing a beam having a centerline and having a substantially
7 Gaussian intensity distribution, and directing it to a beam distorting member through
8 which the beam passes;

9 said beam emerging from said distorting member, when said member is in a
10 cleave position having a chisel shape having a substantially straight side directed to be
11 closely adjacent said holder end face and normal to the central axis of said holder, for
12 cleaving the fiber to produce a substantially flat end face that is substantially flush with
13 said holder end face.

1 2. The apparatus as claimed in claim 1 where said beam distorting member
2 is a focusing lens having a centerline offset from the centerline of the beam when in the
3 distorting position.

1 3. The apparatus as claimed in claim 1 further comprising a positioning
2 member for positioning said beams distorting member to a position where it produces a
3 chisel shaped beam.

1 4. The apparatus as claimed in claim 1 and further comprising a monitor
2 member for producing a visual monitoring of the position of the beam fiber and holder
3 end face for display on a displace device.

1 5. The apparatus as claimed in claim 4 and further comprising a central
2 processing unit and control panel for receiving signals from said monitoring device and
3 producing positioning signals for moving said support member and/or said beam
4 distorting member to a cleave position.

1 6. The apparatus as claimed in claim 5 wherein said beam distorting member
2 is a focusing lens having a centerline.

1 7. The apparatus as claimed in claim 6 wherein the centerline of said lens is
2 offset from the centerline of said beam when said lens is in the cleave position.

1 8. A method cleaving an optical fiber mounted in a ferrule having an end face
2 from which the fiber projects comprising the steps of:

3 creating a laser beam having a Gaussian curve intensity distribution;

4 directing said beam through a beam distorting member to alter the intensity
5 distribution thereof to create a chisel shaped beam having a flat portion and an angled
6 portion; and

7 directing the beam to impinge on the optical fiber, with the flat portion of the
8 beam being closely adjacent the end face of the ferrule and normal to the axis thereof.

1 9. The method as claimed in claim 8 and further including the step of
2 polishing the end face of the fiber to be flat and flush with the end face of the ferrule in a
3 single polishing step.

1 10. The method as claimed in claim 8 and further including the step of
2 visually monitoring the location of the distorted beam relative to the end face of the
3 ferrule.

1 11. The method as claimed in claim 10 and further including the step of
2 moving the beam distorting member into a position to achieve the desired beam
3 configuration for cleaving the fiber.

1 12. The method as claimed in claim 11 wherein the beam distorting member
2 has a central axis and it is moved to a position where the axis of the beam distorting
3 member is offset from the axis of the beam incident thereon.

1 13. The method as claimed in claim 10 and further including the step of
2 moving the ferrule end face into a position where the flat portion of the beam is
3 immediately adjacent the ferrule end face.

1 14. A system for producing optical fiber jumper cables having connectors at
2 the ends thereof said connectors having ferrules holding fibers, said system comprising:
3 a first series of stages for cutting the cable to length, stripping the ends thereof,
4 and inserting and affixing the fiber into the connector ferrule;
5 a laser cleaving stage for receiving the output of said first series of stages, said
6 laser cleaving stage comprising:
7 a laser for generating a laser beam having a Gaussian energy distribution;
8 and
9 a beam distorting member for producing a beam having a flat side
10 substantially normal to the axis of the ferrule and focusing it to a point on the fiber
11 adjacent to the end face of the ferrule;
12 a single step polishing stage for receiving the output of said cleaving stage and
13 polishing the end of the fiber to be flat and flush with the ferrule end face, and
14 an inspection and testing stage for receiving the output of said single step
15 polishing stage.